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Feeling Good Is Feeling Better

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Abstract

Can people remember their past happiness? We analyzed data from four longitudinal surveys from the United States, France, the United Kingdom, and Germany spanning from the 1970s until the present, in which more than 60,000 adults were asked questions about their current and past life satisfaction. We uncovered systematic biases in recalled happiness: On average, people tended to overstate the improvement in their well-being over time and to understate their past happiness. But this aggregate figure hides a deep asymmetry: Whereas happy people recall the evolution of their life to be better than it was, unhappy ones tend to exaggerate their life's negative evolution. It thus seems that feeling happy today implies feeling better than yesterday. This recall structure has implications for motivated memory and learning and could explain why happy people are more optimistic, perceive risks to be lower, and are more open to new experiences.

Keywords

life satisfaction, remembered happiness, memory bias, intrapersonal comparisons, open materials

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When maximizing well-being (or happiness or utility), people have to choose between several alternatives, the value of which they often evaluate on the basis of their memory of the happiness they derived in similar past experiences. Because expectations are partly based on memory, remembered happiness is of importance for decision-making, and memory biases create misleading pieces of information. So how reliable is the memory of past happiness?

Previous research has focused on people's capacity to accurately recall the impact of a specific event on their happiness, such as electoral results (Kaplan et al., 2016; T. D. Wilson et al., 2005) or medical treatments (Smith et al., 2008). This literature has documented structured biases in recalled happiness, but to date little is known about how people recall their previous overall happiness. However, it is often impossible to think about an event in a vacuum, and people's memories are typically governed by the general context of a period of their past life. The question of how people recall the hedonic quality of previous time episodes is not entirely new, and some studies have explored the structure of recalled happiness over a horizon measured in minutes or days (Fredrickson & Kahneman, 1993; Ganzach & Yaor, 2019; Kahneman et al., 1993; Kemp et al., 2008; Strijbosch et al., 2019). Yet socially relevant decisions are often based on the happiness attached to longer time spans on the order of months or even years.

Measuring memory accuracy over long time spans is also a methodological question. From the inception of research on long-term memory (Bartlett, 1932) until today (Chew et al., 2020; Saucet & Villeval, 2019; Zimmermann, 2020), the vast majority of empirical evidence has been found in experiments in which subjects are asked to recall some information they previously learned or reported within the experiment. In spite of their many merits, experiments in this field suffer from some important drawbacks: They take place over a relatively short amount of time, thus not allowing researchers to assess long-term patterns, and often involve relatively small samples, thus hindering the identification of within-population heterogeneity. To make progress in the present study, we used data from

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three publicly available national surveys and one commercial survey. In four studies, we assessed approximately 260,000 self-assessed life-satisfaction judgments from more than 60,000 individuals across several years. By exploiting the longitudinal dimension of the surveys, we compared people's actual life satisfaction with their retrospective evaluations of life satisfaction. The studies complement each other by offering a rich picture of the structure of recalled happiness over a period of years, as they asked the question about past happiness in different ways and over different time horizons.[1]

What is meant by "happiness" matters, too. Psychologists have long known that current happiness plays a role in misremembering (Blaney, 1986; Fiedler & Hütter, 2014) and that a memory-experience gap in happiness exists (Smith et al., 2008; T. D. Wilson et al., 2005). However, the main focus has been on affective states (emotional arousal and mood) rather than on cognitive evaluations (satisfaction). Neglecting this difference leads to an incomplete picture of the relationship between autobiographical memory and happiness and may lead to inaccurate predictions, because different attributes of happiness can relate to different recall dynamics. For instance, memory biases follow opposite patterns depending on whether the recollected feelings relate to the general mood or some episode-related emotions (Kaplan et al., 2016), and specific emotions of the same valence can follow different recall patterns (Levine et al., 2021). We focused on measures of life satisfaction, a construct that captures people's general cognitive and hedonic evaluation of their life, as opposed to momentary evaluations (Kahneman & Krueger, 2006).

Although social scientists are becoming increasingly interested in life-satisfaction data (Clark, 2018), recalled life satisfaction has received little attention so far. Some exceptions are the classic contributions by Cantril (1965) and Easterlin (2001) and the small body of literature dedicated to hedonic adaptation (Clark, 1999; Lyubomirsky, 2011), but none of these works analyzed the discrepancy between reported and recalled well-being. The authors of several recent articles (Kaiser, 2022; Köke & Perino, 2017) noted some inconsistencies between actual and recalled well-being in one of the surveys analyzed here, but they did not attempt to explain the recall structure. A few methodological articles have used recalled subjective well-being to assess the test-retest reliability of life-satisfaction scores (Atkinson, 1982; Michalos & Kahlke, 2010). They found that recalled evolution is imperfect but statistically consistent with the observed variations. Closer to the present work, a small series of studies has uncovered a general tendency of people to report an upward trajectory in life-satisfaction ratings, which often implies overestimating the improvement in their actual life satisfaction compared with its past level (Busseri et al., 2009; Busseri & Samani, 2019). Other research added the observation that this discrepancy between actual and recalled evolution of life satisfaction is especially prevalent among the young (Busseri & Samani, 2019; Lachman et al., 2008). Overall, they suggest that this bias is consistent with a self-motivation device whereby people try to improve their own dynamic self-image and create optimistic beliefs, an interpretation that is close to the theory of *motivated beliefs* (Bénabou & Tirole, 2002). Here, we inquired about the structure of these biases and uncovered an asymmetry that is not explained by sociodemographic variables.

We present four studies that complement each other in the theoretical development and empirical assessment of a model of recalled happiness that generates testable predictions. In its general form, we can describe the model as follows: People who are relatively satisfied with their life at time t tend to recall its long-term evolution more as a stable progression than as a fluctuation (Study 1), to recall its evolution as more favorable than it actually was (Study 2), and to recall its past level as worse than it actually was (Studies 3 and 4). Conversely, people who are relatively unsatisfied with their life tend to recall a more negative past evolution and exaggerate their past happiness. Our recall model contributes to the literature that investigates how retrospective reports of feelings are shifted in the direction of the current set of beliefs (Kaplan et al., 2016; Levine et al., 2001; Robinson & Clore, 2002; Ross, 1989).

Statement of Relevance

Many decisions are based on our memories of the past. But how reliable are these memories? Using more than 250,000 interviews from different countries and epochs, we found that people can remember their past happiness to some extent, but with certain biases. First, most people claim to be happier than they were in the past, although this is not consistent with their historic reports. Second, although happy people overstate the positive evolution of their life, unhappy ones tend to exaggerate their life's negative evolution. These findings shed light on the interplay between happiness levels and variations and help us understand differences in behavioral traits (such as optimism) and attitudes to risk and new experience.

Method

In Studies 1, 2, 3, and 4, we analyzed data from four nationally representative surveys that included questions on recalled happiness. Details of the measured variables and mathematical modeling can be found in the Supplemental Material available online. All data analyzed in this research are publicly available (see below).

Study 1

Since 1984, the German Socio-Economic Panel (SOEP) has been conducting face-to-face interviews of a representative sample of the German population on a variety of topics, including subjective well-being. The sample is a stratified clustered design with 125 primary sampling units. It has included the states of the former German Democratic Republic since 1990. The SOEP is funded by the German federal government and different agencies. Data are publicly available through the SOEP Research Data Center (https://www.soep-cov.de/home_en.html), on agreement with the German Institute for Economic Research (DIW Berlin). Goebel et al. (2019) offer an up-to-date, comprehensive overview of the data set. We excluded the attrition sample and constructed a balanced panel of life-satisfaction data from Waves 23 to 33, which includes 121,616 individual-year observations from 11,056 respondents (53% women, age: average = 52 years, minimum = 16).

A representative sample of German residents is interviewed by the SOEP every year, and in each wave of the survey, respondents are asked to report on a scale from 0 to 10, "How satisfied are you with your life, all things considered?" In 2016 (Wave 33), they were shown nine line graphs and asked the following question: "Which of the nine pictures best represents how satisfied you have been with your personal living situation over the last 10 years, so from around 2006 to today?" By comparing their answers with the chronicle of their yearly reports of satisfaction, we were able to check whether their subjective reconstructions were consistent.

Study 2

The British Household Panel Survey (BHPS) is a panel survey of a representative sample of British residents that was run between 1991 and 2009. Interviews were conducted annually in face-to-face settings and lasted approximately 30 to 40 min. The study had a stratified clustered design with 250 primary sampling units. The survey was representative of Wales and Scotland since 1999 and included Northern Ireland since 2001. The BHPS was funded by the Economic and Social Research Council. Data are publicly available for noncommercial use from the Economic and Social Data Services (https://www.iser.essex.ac.uk/bhps). Comprehensive data-set documentation is provided by the UK Data Service (Taylor et al., 2018).

From 1997 to 2009 (except in 2002), respondents were asked about their general life satisfaction, both in general ("How dissatisfied or satisfied are you with your life overall?" rated from 1 to 7) and compared with the previous year ("Would you say that you are more satisfied with life, less satisfied or feel about the same as you did a year ago?" response options were *more satisfied*, *less satisfied*, *about the same*, and *don't know*). By comparing individual answers over time, we were able to infer discrepancies between the observed (computed by the researcher on the basis of annual life satisfaction) and the reported (declared by the respondent on the basis of their memories) change in life satisfaction. We included 111,894 individual-year observations from 20,269 respondents.

Because the question on general life satisfaction appears in Waves 6 through 10 and 12 through 18 (i.e., 1997–2001 and 2002–2009), we were able to compute first-difference variables for Waves 7 through 10 and 13 through 18. We removed 787 individuals who displayed no variation along the panel and reported satisfaction at the boundaries (they persistently reported life-satisfaction scores of 1 or 7). We ended up with 111,894 individual-year observations from 20,269 respondents (53% female, age: average = 48 years, minimum = 16).

Cross-sectional linear regression. To single out the vector of residual life satisfaction that is orthogonal to the observable characteristics of the respondents, we studied a linear-satisfaction equation and estimated it using ordinary least squares. The equation took the following form: $LS_i = X_i\alpha + u_i$, where LS_i is the life satisfaction of individual i in Wave 7, u_i is a normally distributed error term, and X_i is a matrix of control variables.

Panel nonlinear regression. We studied a model in which the probability to report a given outcome j, j = {*more satisfied*, *about the same*, *less satisfied*}, was determined by current life satisfaction and other covariates—that is, we estimated $P(\Delta\widetilde{LS}_{it}) = j|LS_{it}; X_{it}$, where $\Delta\widetilde{LS}_{it}$ is the recalled change in life satisfaction reported by individual i at time t. We estimated the model by multinomial logit and clustered errors at the individual level to correct for individual-specific error correlation over time. Estimation is valid under the independence-of-irrelevant-alternatives assumption, which seemed very reasonable in our case. We should also emphasize that our model contained only case-specific regressors, that is, variables

that do not change according to the decision that is made (reporting a positive, negative, or null change). If we had alternative-specific variables (e.g., if a person is paid differently according to what they report), conditional or mixed logit models would be more appropriate. We also tested a more flexible specification (with dummy codes for each level of satisfaction, which allowed us to single out effects at the upper and lower bound of the satisfaction scale) and less flexible specification (where we assumed the set j = {*more satisfied*, *about the same*, *less satisfied*} to be ordered and estimated by ordered probit) as a robustness check. Results were substantially the same (see Tables S3 and S4 in the Supplemental Material).

Study 3

The Enquête de Conjoncture Auprès des Ménages (CAMME) is a French monthly consumer-confidence survey run by the National Institute of Statistics and Economic Studies (INSEE). Since June 2016, the survey has included a well-being module, which surveys a representative sample of the French population. Our data set is a longitudinal series of repeated cross-sections over 11 quarterly waves from June 2016 to December 2018. The survey is conducted by telephone on a representative sample of French residents (overseas territories excluded) drawn from the housing tax register. The survey is a partnership between INSEE and the Well-being Observatory of the Center for Economic Research and Its Applications. Data are publicly available through the Réseau Quetelet (https://www.cepremap.fr/Tableau_de_Bord_Bien-Etre.html). Methodological information is available online (https://www.insee.fr/fr/metadonnees/source/serie/s1208/presentation). Our sample consisted of 18,589 respondents (54% female; age: average = 58 years, minimum = 17).

In addition to a question about current life satisfaction ("Overall, how satisfied are you with your current living situation?" rated from 0 to 10), the survey also included a question about the level of satisfaction 1 year ago ("When you think about last year, where would you place yourself on a scale from 0 to 10?"). Therefore, this survey allowed us to observe for the same individual the current level of satisfaction and the remembered level of satisfaction 1 year ago. People were not interviewed twice, so the actual past satisfaction of a given person (as experienced last year) was not available. However, insofar as each sample is representative of the same population, we could compare aggregate data on observed and recalled life satisfaction at the national level. Loosely speaking, we could consider France as an individual and compare its recalled and observed levels of well-being at a 12-month gap.

Study 4

The Gallup Poll Social Series is an American survey run by the Gallup organization. At each wave, a representative sample of the adult U.S. residents (minimum age = 18) are interviewed. Although microdata are not publicly available, aggregate data are published by the organization both in their complete compilation of polls (Gallup & Newport, 2009) and in a report of the Gallup News Service (Moore, 2006). Our analysis is based on these aggregate figures.

In 1971 and 1976, as well as 30 years later, in 2001 and 2006, the Gallup team interviewed a representative sample of the American population and asked them the following questions:

> Please think about a picture of a ladder. Suppose that the top of the ladder represents the best possible life for you, and the bottom represents the worst possible life for you. If the top step is "10" and the bottom step is "0", on which step of the ladder do you feel you personally stand at the present time? On which step would you say you stood five years ago?

We adopted a similar analytical method to that of Study 3 and compared current and recalled life satisfaction for the same year.

Results

Most people feel that they are happier than they used to be in the past. Table 1 presents descriptive statistics for all studies. Average life satisfaction was relatively high in each sample. Most people (52%) reported that they were happier than they were 10 years ago, and people tended to rate their current life satisfaction as higher than it was 5 years ago. Many people reported that they were as satisfied as in the previous year, but the reported changes were asymmetrical: The share of respondents who reported a positive evolution in their life satisfaction was higher than the proportion who reported a negative evolution. This positive picture has already been illustrated by other researchers (Busseri et al., 2009; Cantril, 1965; Lachman et al., 2008), in spite of the accumulated empirical evidence that life satisfaction does not steadily increase over the life cycle.[2]

Study 1

People can, to some extent, recall their past happiness. In Study 1, we used the German SOEP, one of the longest and most comprehensive panel surveys in the world. In each wave of the survey, respondents were

Table 1. Life-Satisfaction Data From Studies 1 to 4

Study and variable	*M*	*SD*	Minimum	Maximum
Study 1 ($N = 121{,}616$)[a]				
Life satisfaction	7.15	1.71	0	10
More satisfied than 10 years ago	.52	.27	0	1
About the same as 10 years ago	.32	.26	0	1
Less satisfied than 10 years ago	.16	.06	0	1
Study 2 ($N = 111{,}894$)[b]				
Life satisfaction	5.19	1.25	1	7
More satisfied than a year ago	.25	.44	0	1
About the same as a year ago	.58	.49	0	1
Less satisfied than a year ago	.16	.36	0	1
Study 3 ($N = 18{,}589$)[c]				
Life satisfaction	6.48	1.73	0	10
More satisfied than a year ago	.30	.45	0	1
About the same as a year ago	.45	.43	0	1
Less satisfied than a year ago	.25	.50	0	1
Study 4 ($N \approx 10{,}000$)[d]				
Life satisfaction (1971–1976)	6.50	2.03	0	10
Life satisfaction (2001–2006)	6.77	1.79	0	10
Life satisfaction 5 years ago (1971–1976)	5.60	2.60	0	10
Life satisfaction 5 years ago (2001–2006)	6.20	2.21	0	10

Note: Study 1 was based on the German Socio-Economic Panel (SOEP), Waves 23 to 33, 121,616 individual-year observations from 11,056 respondents. Study 2 was based the British Household Panel Survey (BHPS), Waves 6 to 10 (1997–2001) and 12 to 18 (2002–2009), 111,894 individual-year observations from 20,269 respondents. Study 3 was based on the French Consumer Confidence Survey (CAMME), 11 quarterly waves from June 2016 to December 2018; 18,589 respondents. Study 4 was based on the Gallup Poll Social Series, Waves 1971, 1972, 1974, 1976 and Waves 2001, 2002, 2003, 2004, 2005, 2006. The standard error of the survey-weight estimated mean is ≤ 0.01 for all means except those reported for life satisfaction in Study 1.

[a]In the SOEP, current life satisfaction was assessed with the question, "How satisfied are you with your life, all things considered?" (from 0 to 10). In Wave 33 (2016), participants were also shown a picture of nine line graphs (see Fig. 1) and asked, "Which of the nine pictures best represents how satisfied you have been with your personal living situation over the last 10 years, so from around 2006 to today?" [b]In the BHPS, current life satisfaction was assessed with the question, "How dissatisfied or satisfied are you with your life overall?" (from 1, *not satisfied at all*, to 7, *completely satisfied*). Current life satisfaction in comparison with the previous year was assessed with the question, "Would you say that you are more satisfied with life, less satisfied or feel about the same as you did a year ago?" Answers were "more satisfied," "less satisfied," "about the same," and "don't know." [c]In the CAMME, current life satisfaction was assessed with the question, "Overall, how satisfied are you with your current living situation on a scale from 0 to 10?" Recalled life satisfaction was assessed with the question, "When you think about last year, where would you place yourself on a scale from 0 to 10?" [d]In the Gallup Poll Social Series, current life satisfaction was assessed with the question, "Please think about a picture of a ladder. Suppose that the top of the ladder represents the best possible life for you, and the bottom represents the worst possible life for you. If the top step is '10' and the bottom step is '0', on which step of the ladder do you feel you personally stand at the present time?" Recalled life satisfaction in comparison with life satisfaction in the Waves 2001 to 2006 was assessed with the question, "On which step would you say you stood five years ago?"

asked to report on a scale from 0 to 10 "How satisfied are you with your life, all things considered?" In 2016, they were shown nine graphs and asked to indicate which picture best represented how satisfied they had been with their personal living situation over the last 10 years. By comparing their answers to the chronicle of their yearly reports of satisfaction, we were able to check whether their subjective reconstructions were consistent. Figure 1 illustrates conditional average observed patterns and compares them with the schematic representation that was chosen by respondents. It turns out that reported and observed patterns are quite close. When one considers the difficulty of the cognitive task at stake—namely, recalling the evolution of a subjective state over a period as long as 10 years—the consistency observed in Figure 1 is not trivial. It solidly corroborates the idea that people can actually recall—to some extent—their past happiness. It also

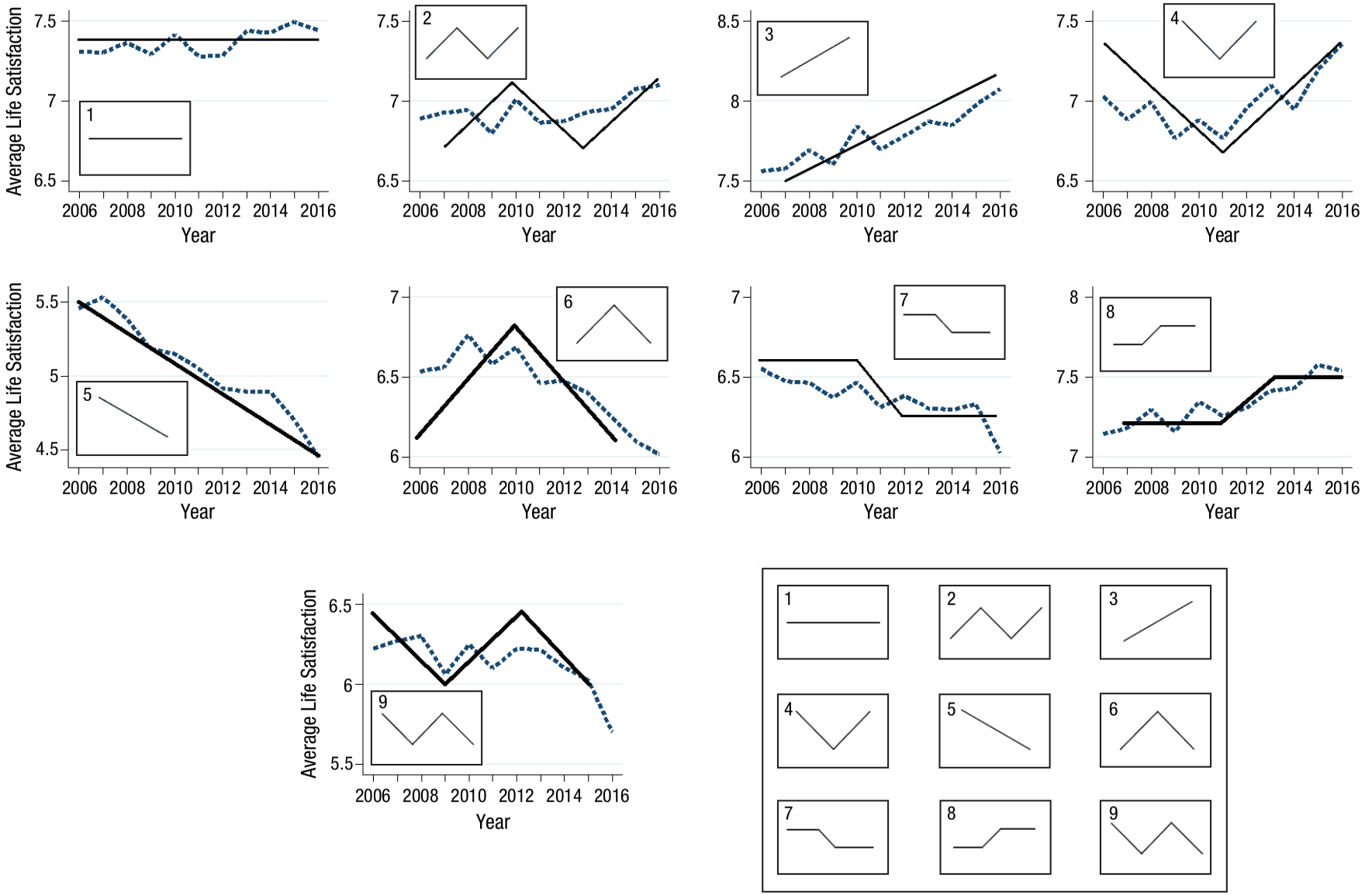

Fig. 1. Observed evolution of life satisfaction over 10 years, conditional on each of nine recalled patterns of life satisfaction in Study 1 (source: German Socio-Economic Panel [SOEP], Waves 23–33 [2006–2016], 121,616 individual-year points). The graphs compare mean life satisfaction as reported yearly by each individual over 10 years (dashed lines) with declared evolution of life satisfaction across time as reported in 2016 (solid lines). Observed life satisfaction was assessed with the question, "How satisfied are you with your life, all things considered?" Declared evolution was assessed by showing participants the nine graphs at the bottom right of the figure and asking, "Which of the nine pictures best represents how satisfied you have been with your personal living situation over the last 10 years, so from around 2006 to today?"

Table 2. Cases of Reporting Behaviors in Study 2 (N = 111,894)

	Observed change			
Reported change	Less satisfied	About the same	More satisfied	Total
Less satisfied	8.3%	5.4%	2.8%	16.5%
About the same	15.0%	28.5%	14.7%	58.2%
More satisfied	4.4%	12.1%	8.8%	25.3%
Total	27.7%	46.0%	26.3%	100%

Note: Data were taken from the British Household Panel Survey (BHPS), Waves 6 to 18 (1997–2009), 111,894 individual-year points. Reported change was measured with the item, "Would you say that you are more satisfied with life, less satisfied or feel about the same as you did a year ago?" Observed change was calculated by taking the difference between current life satisfaction and life satisfaction reported by the same individual the previous year.

offers supporting evidence for the stability of the satisfaction scale, a pivotal assumption needed for any longitudinal study on subjective well-being. Yet some caution is needed in the interpretation of these results. Figure 1 neither proves that people use exactly the same scale over time (this is unlikely to be the case) nor that people recall their past happiness perfectly (as we will show in what follows). Nevertheless, it corroborates the hypothesis that recalled happiness is a meaningful construct, evaluated on a scale that is comparable over time.

Figure 1 also offers some insights on the relationship between average current life satisfaction and participants' recollection of the evolution of their life satisfaction. Consider Pictures 2 (up-down-up), 3 (up-up-up), and 8 (flat-up-flat). More than half of the respondents described their past by indicating one of these pictures (for response frequencies, see Table S1 in the Supplemental Material). The actual longitudinal evolution was very similar: The average individual who chose Picture 8 was equally likely to have chosen Picture 2 or Picture 3 to describe their past. However, an important difference appears: People who recalled different patterns were on different satisfaction levels. Those who were relatively happier (life satisfaction = 8.1) described their past satisfaction as a constant progression (Picture 3), people in the middle (life satisfaction = 7.5) described it as a weakly monotonic improvement (Picture 8) and people who were relatively less happy (life satisfaction = 7.1) reconstructed a nonmonotonic improvement (Picture 2). This difference suggests some influence flowing from the current level of satisfaction to the recollection of past satisfaction. Does feeling good imply feeling better?

To examine the pattern in misrecalling, we restricted the sample to people who reported similar levels of life satisfaction 10 years apart, in 2006 and 2016 (n = 5,993).[3] A simple analysis shows that people who reported positive patterns tended to be significantly more satisfied than people who reported negative patterns. On average, among people who displayed similar levels of happiness in 2006 and 2016, those who recalled a steady positive increase (Picture 3) reported a satisfaction level higher than 8 at both points in time, those who recalled a nonlinear increasing pattern (Pictures 2 and 8) reported life satisfaction of approximately 7.5, those who recalled a nonlinear decreasing pattern (Pictures 7 and 9) reported life satisfaction of approximately 6.5, and those who recalled a steady negative evolution (Picture 5) were much less satisfied than the rest of the population in 2006 and 2016, reporting a life satisfaction of approximately 5 (for a visual illustration, see Fig. S1 in the Supplemental Material). In sum, among people who reported inaccurate patterns, those who were relatively happier tended to recall a steadier positive evolution in their lives.

Study 2

Although data from the German national survey analyzed in Study 1 provided confidence in people's capacity to reconstruct patterns of their past happiness, they also pointed toward some relationship between levels and recalled variations that could not be tested without more granular data. To provide a more accurate picture, we used publicly available data from the British Household Panel Survey (BHPS). Respondents were asked to rate their life satisfaction on a scale from 1 to 7, and to say if they were more satisfied with life, less satisfied or felt about the same as they did the previous year. By comparing individual answers over time, we were able to infer discrepancies between the observed (computed by the researcher on the basis of annual life satisfaction) and the reported (declared by the respondent on the basis of their memories) change in life satisfaction.

We started our analysis by cross-tabulating reported and observed changes in life satisfaction. We distinguished nine cases, displayed in Table 2. The table confirms that people are, to some extent, able to recall the evolution of their well-being. If reported changes

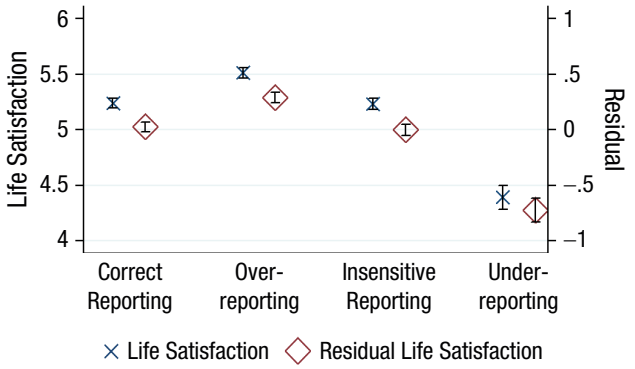

Fig. 2. Conditional and unconditional life satisfaction as a function of reporting behavior in Study 2, Wave 7 (source: British Household Panel Survey, Waves 6 and 7, 1997–1998). The left-hand *y*-axis graphs mean life satisfaction, and the right-hand *y*-axis illustrates mean life satisfaction conditional on sex, age, age squared, log household income, log individual income, education level, number of children, marital status, job status, ethnicity, and dummy-coded demographic change. Correct reporters are people who reported a change in subjective well-being that was consistent with what we observed in Waves 6 and 7. Overreporters are people who reported a positive change in subjective well-being that was not consistent with life satisfaction in Waves 6 and 7. Insensitive reporters are people who reported no change in life satisfaction when we observed one. Underreporters are people who reported a negative change in subjective well-being that was not consistent with life satisfaction in Waves 6 and 7. Error bars represent 95% confidence intervals.

were uncorrelated to observed changes, the nine cells of the table would display similar percentages. Instead, when we observe an increase in the life-satisfaction score (26.3% of the total), people reported a positive evolution three times more often than a negative one; when we observed a decrease in the life-satisfaction score (27.7% of the total), people reported a negative evolution twice as often as a positive one. When we observed no change (46.0% of the total), more than half of the sample reported that they were as satisfied as in the previous year. Nevertheless, discrepancies between observed and reported changes are far from rare. In what follows, we analyze these discrepancies.

Happy people overstate the improvement in their life satisfaction; conversely, unhappy people understate it. For the sake of guidance over our analysis, we classified reporting behaviors into four broad types. The same individual can display different behaviors along the panel, but they display only one reporting behavior per year. *Correct reporting* consists of reporting an evolution of life satisfaction that is consistent with our observations. *Overreporting* consists of reporting a positive change in life satisfaction that is inconsistent with our observations. *Insensitive reporting* consists of reporting no change in life satisfaction when we observed one. *Underreporting* consists of reporting a negative change in life satisfaction when we did not observe one.

Overall, correct reporters represented a little less than half of the sample, and more than 90% of the respondents incorrectly reported at least once. To explore the relationship between reporting behaviors and the current level of satisfaction, we started with a simple analysis of the first cross-section of the BHPS (Wave 7) that included the question, "Would you say that you are more satisfied with life, less satisfied or feel about the same as you did a year ago?" Two opposite patterns appeared (see Fig. 2): Overreporters scored significantly higher in life satisfaction than the rest of the population, $t(7928) = 9.583$, $p < .001$; conversely, underreporters' life satisfaction was significantly lower than the rest of the population's life satisfaction, $t(7928) = -16.70$, $p < .001$. There was no significant difference between reports of life satisfaction by correct reporters and insensitive reporters, $t(5864) = 0.20$, $p = .838$. The uncovered patterns did not seem to be driven by other observable traits, such as income or age. To test this, we carried on a cross-sectional regression by standard ordinary least squares (see Table S2 in the Supplemental Material) and computed the vector of residuals, which is orthogonal to the explanatory variables of the model, by construction. We can interpret this vector as the individual-specific residual life satisfaction, conditional on the observables. Figure 2 illustrates the average residual satisfaction by group of reporting behavior. The uncovered patterns are the same as before: Mean residual life satisfaction was higher for overreporters, $t(7928) = 9.542$, $p < .001$, and lower for underreporters, $t(7928) = -15.07$, $p < .001$, whereas it was statistically equal to zero for the rest of the sample, $t(5783) = 0.87$, $p = .382$.

It is worth noting two points. First, the asymmetry in Figure 2 is not mechanical. Quite the opposite, the dynamic movement along the life-satisfaction scale would predict the reverse: People who reported relatively high satisfaction in Wave *t* were also the ones for whom we were more likely to observe a positive evolution. And if a positive evolution was observed, overreporting cannot happen, because people who reported a positive change would fall into the category of correct reporters. Thus, one's a priori expectation would be that overreporters are relatively less happy and underreporters are relatively more happy. Second, this asymmetry does not follow from individual variations in material conditions (see also Fig. S2 in the Supplemental Material), and it is not driven by a particular age group (see also Fig. S4 in the Supplemental Material).

We now move on to the dynamic panel dimension. When we sketched the frequency of under- and overreporting conditional on life satisfaction, two clear patterns appeared (Fig. 3a). On the one hand, the share of people who declared a positive change that we did not observe was significantly higher among satisfied

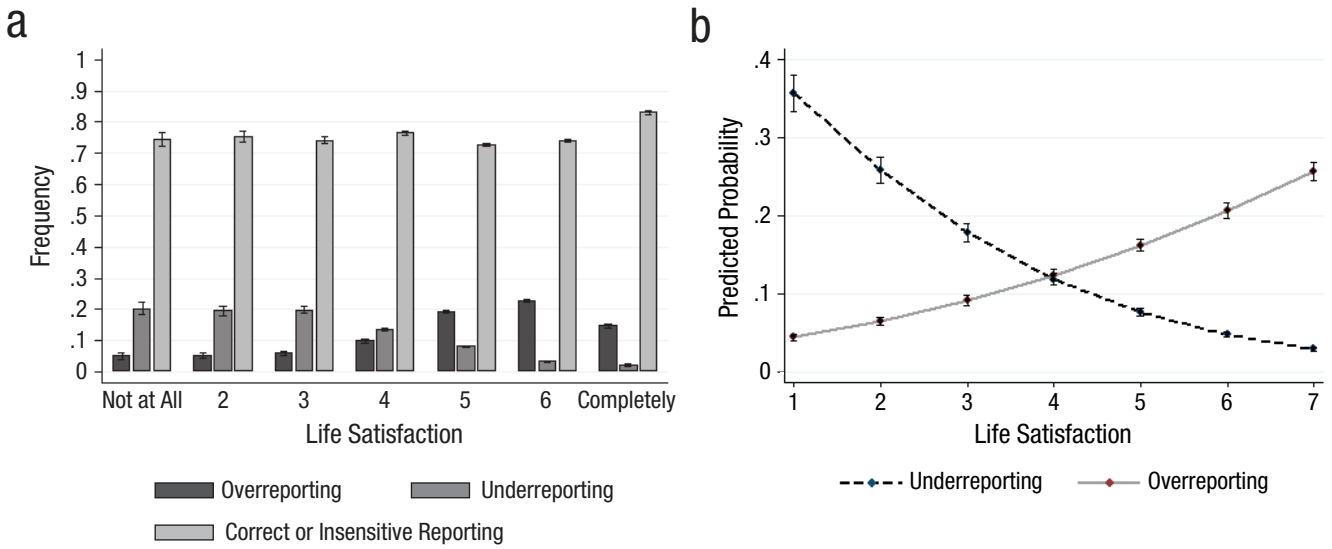

Fig. 3. Misreporting life satisfaction, conditional on current life satisfaction in Study 2 (source: British Household Panel Survey, Waves 6–18, 1997–2009). The distribution of life-satisfaction ratings (a) is shown for each type of reporting behavior. The predicted probability of over- and underreporting (b) is shown as a function of current life satisfaction. In (b), values on the *y*-axis were calculated on the basis of a first-stage regression of the probability of reporting a given outcome (*more satisfied*, *about the same*, *less satisfied*). Life satisfaction includes other covariates, such as sex, age, income, education level, number of children, marital status, job status, ethnicity, and demographic change. Error bars represent 95% confidence intervals.

respondents than among unsatisfied ones. On the other hand, the share of people who declared a negative change that we did not observe was significantly lower among satisfied respondents than among unsatisfied ones. The share of people who reported no change or a change consistent with what we observed in the panel is constant across levels of life satisfaction, except for an increase in the upper boundary. The figure also illustrates the quantitative importance of under- and overreporting, which occurred in approximately one fourth of the population.

To estimate how likely it is that happy and unhappy people recall their pasts differently, we used regression analysis (for the conceptual framework and underlying hypotheses, see the Supplemental Material). We estimated the conditional probability of observing a given reporting behavior by multinomial logit regression, in which we set correct reporting as the base category. Results substantially confirmed the previous analysis: The higher the life-satisfaction level today, the higher the probability of overreporting and the lower the probability of underreporting. For instance, the average individual had an 8% chance of overreporting and a 17% chance of underreporting if they had a life-satisfaction score of 3 at the time of the interview. If instead their life-satisfaction score was high (6), they had an 18% chance of overreporting and a 5% chance of underreporting. Regardless of their satisfaction level, their chance of correct reporting (48% if life satisfaction is 6 and 44% if life satisfaction is 3) or of insensitive reporting (30% if life satisfaction is 6 and 31% if life satisfaction is 3) was very similar. The estimated probabilities of over- and underreporting are graphically displayed in Figure 3b. Regression estimates and estimated probabilities are listed in Tables S4 and S5 in the Supplemental Material. Results were qualitatively the same when we restricted our focus to people who declared the same satisfaction for 2 consecutive years but recalled a change (see Table S4 and Fig. S3 in the Supplemental Material).

Could this phenomenon simply reflect some measurement errors because of the life-satisfaction scale? Scale boundaries cannot explain the overall patterns, which are quite stable along the life-satisfaction scale, with no spike at the boundaries (in Fig. 3a, one can see a small decrease in the share of overreporting at the top of the scale). Moreover, regression results held when we used binary indicators for the different levels of satisfaction, to single out effects at the upper and lower bound (see Table S3 in the Supplemental Material).

What about small stochastic changes that were not captured by the scale? Indeed, people may report a change in life satisfaction because latent satisfaction—which we can consider as a continuous variable—varies, but this variation is not captured by the satisfaction scale, which is discrete. This measurement error could explain over- and underreporting if small changes occur within the range of the same life-satisfaction scale point: People would rightfully report a (small) change,

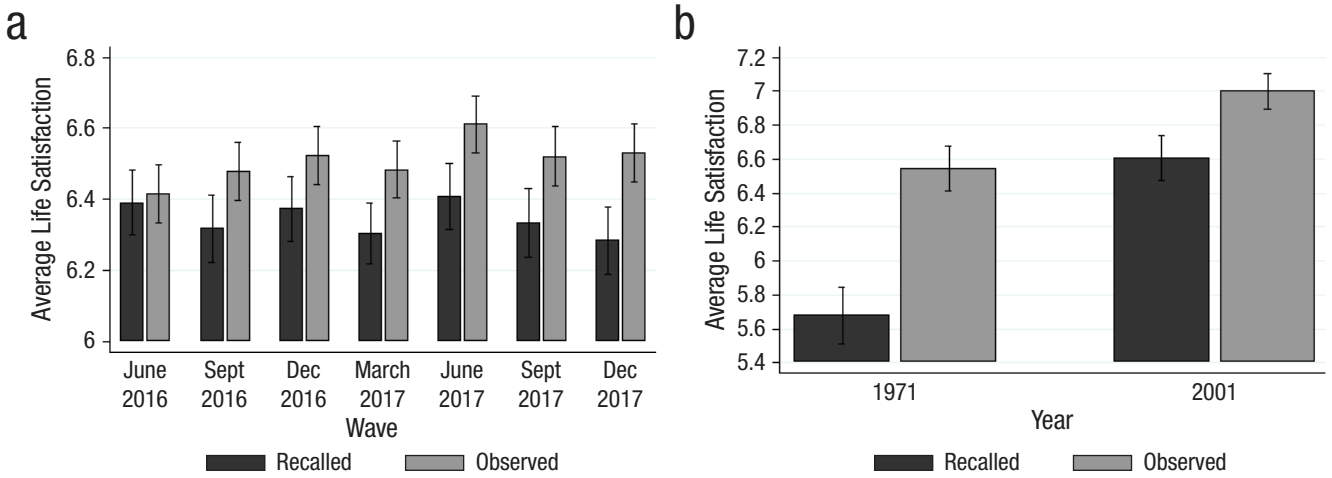

Fig. 4. Average observed and recalled life satisfaction across time in (a) Study 3 and (b) Study 4 (sources: (a) Enquête de Conjoncture Auprès des Ménages [CAMME], Waves 1–11, June–December 2018, 18,589 respondents; (b) Gallup Poll Social Series, Waves 1971, 1976, 2001, and 2006. Gray bars refer to the average current life satisfaction reported in each wave, and black bars refer to the average recalled life satisfaction reported 1 year later. Error bars represent 95% confidence intervals.

but we would wrongly infer misreporting. However, if we modeled the marginal change as a random draw from a symmetrical distribution centered on the latent value, we should be equally likely to observe under- and overreporting. This was not the case because, on average, people tended to overstate the improvement in their life satisfaction. We examined this tendency in Study 3.

Study 3

Study 2 revealed that happy people tend to overstate the improvement in their life satisfaction over time, whereas unhappy people tend to overstate the decline in their life satisfaction. Because the average level of life satisfaction in the population is fairly high (7 on a scale from 0 to 10 or 5 on a scale from 1 to 7), the overestimation bias tends to dominate the underestimation bias. Indeed, Table 2 shows that cases of overreporting are much more common than cases of underreporting (16.5% vs. 8.2%). But does people's tendency to feel better imply a tendency to downplay their past? If a person who reports the evolution of their life satisfaction from a previous period until now is comparing their current satisfaction—which is perfect information—with their past satisfaction—which is mediated by memory—then overstating the evolution of well-being implies understating the past level of well-being. To test this prediction, we would need to elicit the recalled level (rather than the variation) of well-being. Study 3 made use of a survey that contains exactly this question. Moreover, because people were interviewed only once in that survey, we could be sure that they were trying to remember their past happiness level rather than the numerical response they gave in the previous interview.

People tend to understate their past happiness and to overstate the improvement in their happiness over time. In Study 3, we used quarterly data collected in France by the CAMME survey. In addition to a question about current life satisfaction, the survey also included a question about the level of satisfaction 1 year ago. Therefore, we could compare the average recalled and observed levels of well-being in France at a 12-month gap. Figure 4a contrasts recalled and observed happiness across seven quarters.

Consistent with our predictions, results showed that at each quarter, the average reported well-being at a point of time was higher than the average well-being recalled for the same period. Differences were statistically significant at 10% or 5% for all periods except the first one. On average, people tended to downplay their past happiness.

Study 4

Across Studies 1, 2, and 3, we provided evidence of a specific structure of recalled happiness based on European data from the last three decades. However, cultural and historical factors can influence retrospective preferences, so it is unclear to what extent our findings are generalizable. Study 4 explored this question by using aggregate data collected by Gallup in the early 1970s and in the early 2000s in the United States.

Respondents were asked to think about their life and say where, on a 0 to 10 scale ladder, they thought they stood at that moment and 5 years ago. Results, displayed in Figure 4b, essentially replicated the ones from France: On either side of the Atlantic Ocean, 50 years ago as well as 20 years ago, people tended to recall their past happiness as lower than it actually was, $t(969) = -8.94$, $p < .001$, and $t(989) = -5.01$, $p < .001$, for comparisons between recalled and reconstructed happiness 50 years ago and 20 years ago, respectively.

Discussion

People's remembered well-being seems to be influenced by their current level of life satisfaction. Although happy people tend to overstate the positive evolution of their life satisfaction, unhappy ones tend to exaggerate their life's negative evolution. The asymmetric biases that we uncovered cannot be explained by the limits of the measurement tool that we used—that is, happiness scales. Rather, they seem to derive from purely behavioral factors.

Our findings clearly point to the confusion between levels and variations of happiness. Existing behavioral theories of subjective well-being have abundantly shown that differences and gaps often matter more for individual happiness than absolute levels (of income, for instance). Here, we documented another type of confusion between levels and variations. We uncovered the influence that flows from a person's level of happiness to their remembered past happiness, and the dynamic evolution thereof.

These findings contribute to the existing literature both on autobiographical memory and on subjective well-being but in different ways. The (partial) correspondence between recalled-happiness trajectories and observed-happiness trajectories provides an unprecedented test that rules out the threat of full adaptation of the life-satisfaction scale.[4] The documented tendency to overstate the improvements in happiness supports the hypothesis that people prefer improving sequences not only in prospective judgments (Caplin & Leahy, 2001; Frank & Hutchens, 1993; Loewenstein, 2006; Loewenstein & Sicherman, 1991; Senik, 2008) but also in retrospective judgments. It also complements recent experimental evidence on motivated memory for self-relevant outcomes (Saucet & Villeval, 2019; Zimmermann, 2020). Thanks to the study of a long time span, it shows that most people tend to recall an improving happiness profile but tend to downplay—rather than outplay—their past well-being. These results invite reconsideration of the hypothesis that recalling positive self-relevant outcomes is ego enhancing: Comparisons with an inferior past may be beneficial (Tversky & Griffin, 1991; A. E. Wilson & Ross, 2000, 2001).

Finally, the observed asymmetry in recall patterns between happy (top of the scale) and unhappy (bottom of the scale) people suggests the existence of some heterogeneity in coping mechanisms and ex post rationalization that might remain veiled in small samples. This misperception structure can have important behavioral implications. In particular, it could create a self-reinforcing divergence between happy and unhappy people. Indeed, if happy people tend to think that they were less happy in the past, they will tend to be less conservative and more open to innovation. By contrast, if unhappy people believe that they used to be happier in the past, they could tend to be backward looking and hence be more attached to the status quo ante. This could constitute a new and additional explanation of the reason why happy people are more optimistic (Foster et al., 2012), perceive risks to be lower (Johnson & Tversky, 1983) and are more open to new experiences (Furnham & Petrides, 2003), whereas unhappy people are more pessimistic, are reluctant to change, and perceive higher risk.

This work was limited by the availability of data on recalled happiness, and some important issues should be addressed in future research. First, despite evidence that the recalled hedonic quality of an experience underlies decision-making (Kahneman et al., 1993), this research did not directly study the latter. Its natural extension is to look at how the way people recall their life narratives influences their behavior. This avenue for research belongs to a growing body of evidence that documents the predictive power of reported happiness for subsequent behavior—for example, when it comes to productivity (Bellet et al., 2019; De Neve & Oswald, 2012; Oswald et al., 2015)—and for subsequent health outcomes, such as morbidity, mortality, and health-care utilization (Goel et al., 2018; Rosella et al., 2019).

Second, our studies are based on the standard assumption that scales are invariant. This seems to be a reasonable approximation on average (see Fig. 1), but alternative avenues are possible. Theoretically, if happy and unhappy people use their scale differently (as recently conjectured by Kaiser, 2022), and if the population actually becomes happier over time, this rescaling process could explain the patterns we observed and help solve the long-standing Easterlin paradox. As we have shown in this research, data on recalled happiness can help to jointly test some hypotheses on the use of the satisfaction scale and on the recall process. We believe that the use of transition ratings in national surveys (e.g. "Overall, how dissatisfied or satisfied are you as compared to last year? [–5, +5]"), which are common in clinical studies but virtually absent in subjective well-being research, could greatly illuminate this path.

Thirdly, all our studies were based on representative samples of adult populations in Western countries. It would be useful for future work to further explore the generalizability of our results to different populations (e.g., children, non-Western countries).

Lastly, although our results are compatible with the functional role of different patterns in misrecollection, we could not directly assess functional aspects because this would introduce a circular element (people feel better, because they feel good, because they feel better, and so on). Nevertheless, as a first exploratory step in this direction, we analyzed 12 mental health outcomes that are measured in the British panel survey (using the 12-item General Health Questionnaire; Goldberg, 1978). It turns out that the individual propensity to revise one's own past in a positive or negative way correlates with all dimensions of mental health, even when analyses control for a given life-satisfaction level (see Tables S6 and S7 in the Supplemental Material). The higher the propensity to overreport, the better the mental health outcomes; the higher the propensity to underreport, the lower the mental health outcomes. Individual propensities to over- and underreport also predict some aspects of future mental health, such as general happiness and sense of playing a useful role (see Table S8 in the Supplemental Material). In future research, it will be important to understand the role of recall patterns in shaping emotions, attitudes, and beliefs.

Transparency

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Author Contributions

A. Prati and C. Senik conceived the four studies. A. Prati analyzed the data. Both authors wrote the manuscript and approved the final version for submission.

Declaration of Conflicting Interests

The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

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Open Practices

German Socio-Economic Panel (SOEP) data are publicly available at https://www.soep-cov.de/home_en.html, British Household Panel Survey (BHPS) data are publicly available at https://www.iser.essex.ac.uk/bhps, Enquete de Conjoncture Aupres des Menages (CAMME) data are publicly available at https://www.cepremap.fr/Tableau_de_Bord_Bien-Etre.html, and aggregate Gallup data are available in Gallup and Newport (2009) and Moore (2006). All analysis scripts have been made publicly available via OSF and can be accessed at https://osf.io/bavsw/. The design and analysis plans for this study were not preregistered. This article has received the badges for Open Materials. More information about the Open Practices badges can be found at http://www.psychologicalscience.org/publications/badges.

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Supplemental Material

Additional supporting information can be found at http://journals.sagepub.com/doi/suppl/10.1177/09567976221096158

Notes

1. The term "memory" is very rich and complex. In the present article, we will use it uniquely to refer to self-referential, long-term explicit memory. We refer to "biases" without any negative connotation and refer to them as cases in which people's current knowledge and beliefs distort their memory of the past (Schacter et al., 2003). The use of the term is compatible with the classic notion of bias in behavioral economics, namely, systematic errors of judgment that occur under specific conditions (Tversky & Kahneman, 1974).
2. The average observed pattern is U-shaped, with a ditch around 50 (Blanchower & Oswald, 2008).
3. To preserve a sufficiently large sample, we allowed for a 1-point discrepancy, so that $LS_{it} \approx LS_{it-10}$ if $LS_{it} = LS_{it-10} \pm 1$. If we adopt a strict definition and consider only cases when $LS_{it} = LS_{it-10}$ (2,676 observations), results are qualitatively similar but confidence intervals are sensibly larger.
4. If the scale completely shifted over time, the sole way to interpret Figure 1 would be that recall errors and memory shifts compensate each other. This hypothesis is not impossible but is at least very unlikely.

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